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Understanding Participant Engagement in Problem Structuring Interventions with Self-Determination Theory

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Understanding Participant Engagement in Problem Structuring

Interventions with Self-Determination Theory

Abstract

The importance of understanding how Soft OR methods work is increasingly being recognised. However, gaining insight into how participant engagement develops at the micro-level of a problem structuring intervention is an ongoing challenge. This exploratory study addresses the question: How do intrinsically motivating experiences of participants unfold in problem structuring interventions? A sensitising device for the study of motivational affordances in problem structuring interventions is proposed, grounded in self-determination theory, interaction aesthetics and the generic constitutive definition of problem structuring methods. Applying this lens to empirical episodes from a problem structuring intervention, eudaimonic and hedonic experiences of participants are made visible. In this way, the approach proposed in this paper contributes to an enriched understanding of how Soft OR methods work and enhances our conceptual repertoire for reflection on practice.

Keywords: Problem Structuring, Soft OR, Behavioural OR, Process of OR

Word count: 5532, excluding abstract and references

1. Introduction

For the past forty years, within the Soft OR paradigm, Problem Structuring Methods (Rosenhead, 1989, 2013; Smith & Shaw, 2019) have played an important role in supporting groups to collaboratively develop a shared understanding of the wicked problem situation they face (Ackermann, Alexander, Stephens, & Pincombe, 2019; Lowe & Yearworth, 2019). However, the continued use of different methods for problem structuring (Yearworth & White, 2014) and the contested nature of Problem Structuring Methods (Harwood, 2019) have led to a growing interest in understanding how methods work (practice of OR) rather than what they are (research about OR) (Franco & Greiffenhagen, 2018).

Specifically, considering participant engagement in-situ, experienced OR practitioners suggest that models "can be toys that a group can play with together" (Eden, 1992a), that participant engagement in problem structuring interventions is brought about in the process of "doing what feels good" (White & Taket, 1993) and that "creating and sustaining connections within systems that are uplifting, open, and mutually beneficial" (Hämäläinen, Jones, & Saarinen, 2014, p. 103) is important for engagement. Yet, to date, few studies have attempted to make the micro-processes (Ackermann, Yearworth, & White, 2018; Franco & Greiffenhagen, 2018) of such participant experiences in-situ visible and thereby accessible for reflection (Ackermann, Eden, & Pyrko, 2016; Burger, White, & Yearworth, 2018). As such, there is a lack of a conceptual repertoire to assist OR practitioners with understanding how such situated motivational engagement of participants in problem structuring interventions unfolds. The aim of this paper is to explore how participant engagement develops at the micro-level of moment-to-moment interactions in-situ, extending the current conceptual repertoire with a theory-driven sensitising device and thereby contribute to the wider programme of research in the practice and process of OR (Ackermann, Yearworth and White, 2018; Franco & Greiffenhagen, 2018; Franco & Hämäläinen, 2016; White, 2016).

Research that seeks to advance our understanding of how methods for problem structuring work, needs to attend to affective processes in-situ (Boothroyd, 1978; Ormerod, 2010). Participant engagement becomes an important consideration when aiding participants in formulating their intentions (Checkland, 1989) and supporting them in developing their sense of volition (autonomy) in a wicked problem situation (Rittel & Webber, 1973; Rosenhead, 1989). Realising intrinsically motivating engagement depends, in part, on participants experiencing the development of competence (Csikszentmihalyi & Robinson, 1990; Seligman & Csikszentmihalyi, 2014). This is aided in Soft OR interventions, for example, by including phases of appreciation, analysis, and exploration of a problematic situation, thereby guiding participants through the process of developing the requisite competence to take action (Mingers & Brocklesby, 1997). Finally, prior OR work has emphasised the importance of aiding participants with social processes in interventions (Eden, 1990; Eden, 1992c). Here, the emphasis on relations (Hämäläinen et al., 2014, p. 103), points towards the importance of the participants' social relatedness for collaborative action.

The concepts of volition (autonomy), competence and relatedness thus appear relevant to inquire into the participants' interactions during a problem structuring intervention. As such, self-determination theory (SDT) (Deci & Ryan, 1985; Ryan & Deci, 2000, 2017) stands out as a promising lens to study participant engagement in problem structuring practice to aid with answering the question: How do intrinsically motivating experiences of participants unfold in problem structuring interventions?

2. Theoretical background

Self-determination theory (Deci & Ryan, 1985; Ryan & Deci, 2000, 2017) suggests that the participants' desire to engage in developmental activities, such as problems structuring interventions (Checkland, 2011), is driven by psychological needs for a sense of competence

(desire for mastery), autonomy (a sense of volition) and relatedness (a sense of connectedness with other people or ideas) (Peters, Calvo, & Ryan, 2018; Ryan & Deci, 2017).

In theorising engagement as a needs-realising process, SDT places a unique emphasis on the task of designing conditions that encourage the participants' intrinsic motivation and thereby facilitate engagement (Schewe, 2016; Skinner & Pitzer, 2012). As such, contexts and activities which satisfy the three basic needs result in greater perseverance and performance, i.e. engagement, than contexts that do not (Rigby, 2015; Rigby & Ryan, 2018; Ryan, Rigby, & Przybylski, 2010). SDT, therefore, appears to be a suitable perspective to study methods for problem structuring (Yearworth & White, 2014), as a part of the social-contextual conditions in an intervention that are relevant for intrinsic motivation, and thereby to understand better how methods work.

Participation in an activity can be experienced as enjoyable in periods of intense immersion in activities that are intrinsically rewarding (Csikszentmihalyi, 1990, 1997, 2000, 2002; Getzels & Csikszentmihalyi, 1975; Kowal & Fortier, 1999; Skinner & Pitzer, 2012). Here, SDT suggests that participant engagement in needs-fulfilling activities does not diminish their needs for competence, autonomy and relatedness. Instead, SDT proposes that people are driven to engage in more need-fulfilling activities (Ryan & Deci, 2000). As such, SDT appears suitable for theorising motivation for iterative participant engagement in problem structuring activities in wicked problem situations (Kolb, Boyatzis, & Mainemelis, 2001; Rosenhead, 2013).

Following SDT, it can be suggested that continued participant engagement arises from the intrinsically motivating experience of satisfying the basic needs for competence, autonomy and relatedness (eudaimonic experiences) (Ryan et al., 2010; Tamborini, Bowman, Eden, Grizzard, & Organ, 2010). Moreover, aesthetic experiences that arise during the problem structuring activities can strengthen the motivational pull of the intervention (hedonic experiences). Hence,

needs-realising activities and hedonic experiences are both motivational; however, the former are necessary for enduring intrinsic motivation in an activity, whereas the latter can simply increase the motivational strength of an activity. This relationship is shown in Figure 1.

---Figure 1 here ---

Such a situated approach views motivation as a process that takes place in, and depends on context (Fulmer & Frijters, 2009). Accordingly, we can conceptualise participant engagement (Figure 1) as the outward manifestation of motivation (Skinner & Pitzer, 2012). Here, the perspective of interaction aesthetics (Locher, Overbeeke, & Wensveen, 2010) becomes important as it draws attention to the richness of real-world engagement in-situ to consider especially how problem structuring interactions are undertaken by participants in ways that appear meaningful and worthwhile to them (cf. Csikszentmihalyi & Robinson, 1990; Locher et al., 2010; Overbeeke, Djajadiningrat, Hummels, Wensveen, & Prens, 2003; Xenakis & Arnellos, 2013).

3. Methodology

To make visible how participant engagement develops in-situ, it is necessary to study the experience of participants as it unfolds in real-time (Horlick-Jones & Rosenhead, 2007; Velez-Castiblanco, Brocklesby, & Midgley, 2016; White, Burger, & Yearworth, 2016). This requires qualitative, rich and in-depth accounts of the actuality of engagement in naturalistic environments, i.e. outside the lab (Bueger, 2014; Nicolini, 2017; Nicolini, Gherardi, & Yanow, 2003). A qualitative interpretive case-study approach (cf. Klein & Myers, 1999) is adopted here, to enhance knowledge about participant engagement in-situ through the de- and subsequent re-construction of the individual case (Baxter & Jack, 2008; Yin, 2009). This

approach has a long history in qualitative psychology (Biggerstaff, 2012; Hayes, 2013) and the social sciences (Guba & Lincoln, 1994, 2005; Lincoln & Guba, 1986).

3.1 Data collection

The empirical data is drawn from a problem structuring intervention which was conducted in a community centre in Portsmouth, UK. Participants were executive members of a non-governmental organisation (NGO), including the Founder and Head of the organisation. The organisation faced the challenge of having to develop a business model in a participatory manner. As there is no 'correct' solution for a business model, which is influenced by personal values and aims as well as fit with the local context, and business model innovation is an ongoing challenge, business model development can be considered a wicked problem (Breuer & Lüdeke-Freund, 2017; Foss & Saebi, 2018), such that a problem structuring approach is appropriate. Starting from the assumption that collective entrepreneurship is a learnable, distributed concept (Johannisson, Ramírez-Pasillas, & Karlsson, 2002), the business model canvas (BMC) (Osterwalder, Pigneur, Oliveira, & Ferreira, 2010) was chosen, which has been previously used in the context of Soft OR interventions (Hindle, Vidgen, Hamflett, & Betts, 2015; Vidgen, Hindle, & Randolph, 2020) and is freely available to NGOs as part of NESTA's DIY (Development Impact & You) Toolkit (NESTA, 2014, p. 22), which contains a range of methods that organisations can use to structure their continued development efforts.

The BMC is used as part of a participative, procedurally rational, process of problem structuring, which is aimed at engaging multiple stakeholders in developing a requisite model for improvement action (cf. Midgley et al., 2013; Phillips, 1984). As a conceptual modelling approach (NESTA, 2014; Osterwalder, Pigneur, Oliveira, & Ferreira, 2010), the BMC aids participants with organising their thinking about the complex challenge of business model development and innovation, which requires the coordination of interrelated activity areas (e.g. cost structure, revenue stream, channels and key resources). As such, the BMC offers "an

organised way of tackling perceived problematical (social) situations ... it organises thinking about such situations so that action to bring about improvements can be taken" (Checkland & Poulter, 2006, p. xv). Being based on the assumption that complex problems are difficult to unravel if one only looks at related elements separately, the BMC proposes that participants develop a systems model of the organisation's activities by mapping the different activity areas and their relationships on the canvas. The modelling process is iterative, allowing participants to consider alternative combinations of elements in the activity areas, and participants proceed through the constant comparison of the conceptual model with their understanding of the complex relationships between the different elements, and the possibilities they can jointly see for improvement. Through a structured dialogue about desirable and feasible approaches to intervene in their system of concern (Foote, Midgley, Ahuriri-Driscoll, Hepi, & Earl-Goulet, 2020), participants thus develop a shared understanding of the problematic situation and can arrive at agreed opportunities for improvement action (cf. Osterwalder, Pigneur, Oliveira, & Ferreira, 2010).

At the beginning of the problem structuring intervention, an NGO member introduced the BMC (Osterwalder et al., 2010), as the chosen method and the author explained its role in NESTA's DIY (Development Impact & You) Toolkit (NESTA, 2014, p. 22). Participant observation (Spradley, 2016), whereby the researcher interacts with participants in their normal environment, can produce insight into phenomena that emerge in real-world settings (Padgett, 2016). As such, the author remained in the room during the problem structuring intervention, which was conducted mainly in a self-facilitated mode, with participants drawing on the prompts for self-facilitation as detailed in the DIY toolkit. The author's main role during the problem structuring intervention was to provide the materials (the large-scale canvas for the table, the sticky notes and markers) and set up the video cameras and audio recorders, i.e. the 'trivialities' (Eden & Ackermann, 2004). On a couple of occasions during the problem

structuring intervention, participants addressed the author to request procedural and terminological clarification. Apart from these instances, the author remained in the background. Video recording was used to create a rich record of the participant interactions in-situ (Lipshitz, Klein, Orasanu, & Salas, 2001), in addition to the author being present at the workshop. This is a suitable approach for capturing the micro-behaviours of the participants during the problem structuring activities (Baker, Bunch, & Kelsey, 2015; Burger et al., 2018; Burger, White, & Yearworth, 2019; Crowe et al., 2011; Paroutis, Franco, & Papadopoulos, 2015; White, Burger, & Yearworth, 2016). When video recording is used as a data collection instrument, questions arise around possible participant reactivity to the research instrument affecting the natural course of interactions as a result of being observed (Lomax & Casey, 1998; Paterson, 1994). However, prior research, including in OR (Shaw, 2006), suggests no significant difference in behaviour owing to awareness of video recording (Pringle & Stewart-Evans, 1990). To analyse the rich video data, a sensitising device was constructed.

3.2 Data analysis

Interpretive qualitative case research (Klein & Myers, 1999) seeks to aid with *theorising for understanding*, and the status of theory in interpretive research is that of a sensitising device (Alvesson & Kärreman, 2011; Pettigrew, 1990). To construct a sensitising device, the characteristics of methods for problem structuring were taken as a starting point. Within the Soft OR paradigm, the set of problem structuring methods (PSMs) (Rosenhead, 1989, 2013; Smith & Shaw, 2019) is a sub-set (Harwood, 2019; Yearworth & White, 2014) of all possible approaches for problem structuring, which share a number of constitutive characteristics (Ackermann, 2012; Yearworth & White, 2014). To be able also to consider cases in which the chosen method is not taken from the traditional set of PSMs, the generic constitutive definition

(Yearworth & White, 2014) of methods for problem structuring is included in the sensitising device (Table 1).

Moreover, prior work with SDT has studied how environments can be designed to be more conducive to experiences of competence, relatedness, and autonomy through their emotional appeal (Rigby, 2015; Ryan & Deci, 2006). Hence, to study the aesthetic experience of participants as they interact in a problem structuring intervention, concepts from interaction aesthetics are drawn upon, an area of research which focuses on how design elements can be used to create desirable emotional responses when participants interact with designed objects or systems (Hunicke, LeBlanc, & Zubek, 2004; Möttus & Lamas, 2015).

Specifically, to guide the exploratory study, a well-established taxonomy which identifies aesthetic design elements (Hunicke, LeBlanc, & Zubek, 2004) for creating high-engagement activities is used, which has been found to be useful in a wide range of scenarios (e.g., Leclercq, Poncin, & Hammedi, 2017; Peters et al., 2018). The choice of the taxonomy, which has a demonstrated broad applicability, is appropriate to guide the exploratory inquiry as there is no agreed or exhaustive set of possible aesthetic design elements of relevance in problem structuring interventions (Aubert, Bauer, & Lienert, 2018; Aubert & Lienert, 2019). Aesthetic design elements can thus be seen to constitute 'contextual supports' offered while participating in an activity that satisfies a person's psychological needs (Chen, Baird, & Straub, 2019; Deci, Vallerand, Pelletier, & Ryan, 1991). Through the iteration between concept- and data-driven analysis (Kelle, 2007), the possibility remains open to further refine the taxonomy.

The concept-driven sensitising device which guides the data analysis is presented in Table 1.

--- Table 1 here ---

Data analysis proceeded through immersion in and the iterative study of the video recordings and re-reading the full transcripts of the problem structuring intervention, iterating between concept-driven and data-driven interpretation (Klein & Myers, 1999; Orton, 1997), without rigid adherence to purely deductive or purely inductive strategies (Langley, 1999; Sandberg, 2005). The iteration between concepts and data led to the identification of the episodes in the data, which aim to retain the social complexity and are internally bounded (Derry et al., 2010; Emerson, 2007; Stake, 1995). During immersion in the data, researchers are influenced by their disciplined subjectivity (Bateson, 1989), theoretical interest and the specific research question. Thus, the three episodes, which were identified from the workshop, stand out from the recording in two ways. First, based on their theoretical value (Zack & Graves, 2001) in that they provide insight into how intrinsically motivating participant engagement appears to develop in needs-realising interactions in-situ. Second, based on their narrative value (Geertz, 1973), which enables a reader to get a sense of the participants' in-situ interactions despite not having been present. As such, the identified episodes contribute to the aim of making the complex contextualised practice of participant engagement in a PSI understandable (Derry et al., 2010). They can thus be best thought of as constituting rich examples of how participant engagement unfolds in context (Littleton & Mercer, 2013). Working with such episodes allows the communication of an experiential understanding of the data (Stake, 1995) and also has precedent in Soft OR research (Burger et al., 2019; Franco, 2013; Tavella & Papadopoulos, 2017; White, Yearworth, & Burger, 2015). In-depth micro-level interpretation is effective at showing how phenomena such as engagement sequentially develop in context, and at demonstrating how multiple actions and people collectively produce phenomena (Bakeman & Adamson, 1984; Derry et al., 2010). There is no pretence of objectivity because the main tool that the researcher uses is her ability to interpret the situated activity (Bateson, 1989).

3.3 Reflection on credibility

In qualitative research, credibility refers to the believability of the findings (Leininger, 1994), i.e. the authenticity, plausibility and trustworthiness of the research. Authenticity is supported in this study through the video data capture as a re-viewable record of the interaction, with transcripts providing a transparent record of the participants' discursive interactions. Moreover, by collecting data from a real organisational problem situation, the research aims to capture authentic participant interactions in the real world.

Plausibility is supported by detailing how the author's interpretive process proceeded by specifying the theoretical concepts alongside the empirical data in the episodes in the findings section, after having made the author's interpretive repertoire, in this case, the sensitising device, explicit (Table 1). The detailed transcripts ground the analysis in the data, and the transparency of the interpretation allows the reader to critique the reasoning: the column 'interpretation' (Tables 2, 3, 4) shows how the concepts in the sensitising device appear in these episodes (Stake 1995). Text in italic font in Tables 2, 3, and 4 indicates interactions with the model and the bold font is used to indicate emphasis as identified by the author during the interpretive process.

Trustworthiness is established by making the logic of the methodology explicit, i.e., the use of illustrative narrative episodes that serve as examples to study participant engagement as it unfolds in-situ, without aiming to give a definite picture of all different kinds of motivational events during the intervention. Trustworthiness here is provided in part by providing the rich and recognisable experiential material in the episodes, as well as offering theory-driven reflective insights in the discussion which go beyond taken-for-granted understandings of participant interaction in Soft OR interventions (cf. Ashworth & Longmate, 1993).

4. Findings

The following three episodes illustrate how activities that are constitutive of a problem structuring intervention (Yearworth & White, 2014), motivational needs-realising processes (Rigby, 2015; Ryan & Deci, 2017) and aesthetic experiences (Hunicke et al., 2004) unfold during the problem structuring intervention.

4.1 Competence in building a shared understanding

Episode 1 shows a very early interaction during the problem structuring intervention in which participants explore an activity area on the canvas that prompts them to articulate their organisation's value proposition by asking: 'What do you do?'. This episode shows how participants overcome the challenge of articulating what their organisation is about: Moving from *'it's tricky when someone asks you a question'* to *'we're done with this one'* suggests perceived mastery of the challenge.

--- Table 2 here----

This episode illustrates how participants overcome the limits imposed by a lack of terminology available to individuals by participating in a shared discovery process (*'so, how do you put that?'*). The back-and-forth between the canvas and the adding of the sticky notes (passing the marker, writing sticky notes, inquiring (*'have you written this?'*), adding to the model (*'yeah, stick it'*) illustrates how the sensation of being engaged in a constructive process, improves the participants' ability to articulate a shared understanding of 'what we do', which is expressed visually through the growing number of sticky notes on the canvas. Participants proceed from a blank canvas to a box which is filled with sticky notes, which can be modified and adapted in the next iteration over the canvas (*'we can still be doing that, and maybe we'll realise that,*

later, we'll realise that was [..]'). This allows participants to move on to the next part of the model, i.e. towards the next challenge that is prompted by the remaining questions in blank boxes on the canvas.

4.2 Autonomy in developing a shared sense of ownership

Episode 2 shows how the participants experience volition when they move beyond the description of their value proposition as prompted by the model (*'what **do** we do'*) towards realising that the method affords them the freedom to imagine which activities they ***want*** to do (*'what we **want** to do'*).

--- Table 3 here ----

This episode illustrates, by going beyond the reality of *'what we do'*, how participants start to imagine possible future activities through an exchange of viewpoints and values. Creativity is exercised when participants project themselves into the future and imagine how their operations could expand to other countries through partnering. The development of acceptable new activities is then negotiated by going back to and agreeing on areas (education, women and children empowerment) that all participants consider important. Opportunities for communicating subjectivity in experiencing the world, including associated values, are offered through the narrative character of the qualitative modelling process, and facilitate the development of a shared sense of ownership of the organisation's activities by grounding them in shared values (*"so if for instance education is something that's, that's erm, part of our vision statement"*).

4.3 Relatedness in experiencing shared struggles

Episode 3 illustrates how a sense of relatedness develops as the participants, prompted by the model which asks about revenue streams, share their difficulties in asking new donors to sign up for monthly donations using a paper-based form. One participant shares the reactions she has experienced ("*once you show that to people, they're scared; they don't really feel comfortable to*"), leading to an exchange of experiences, until the participants can express their perceived shared skills shortage (the need for fundraising training), and P1 also opens up about her difficulties ("*we need training, sometimes I even feel embarrassed to ask people for money, you know what I mean*").

--- Table 4 here ---

This episode illustrates how the sharing of one's troubles can be cathartic, and a sense of fellowship and belonging is created (*you know what I mean*), as the participants see themselves as being part of the same 'system' (**we** need..), as opposed to seeing themselves as detached observers.

Considered jointly, the three episodes make eudaimonic needs-realising and hedonic aesthetic experiences in problem structuring activities visible, making interpretable how these experiences are inherent in the interactional processes that characterise participant engagement in a problem structuring intervention.

5. Discussion

The preceding analysis of the three episodes illustrates how participant engagement in problem structuring activities can be interpreted as a needs-realising and aesthetic experience. These findings can be presented in an enhanced conceptual model of intrinsically motivating participant engagement in problem structuring interventions (Figure 2). The patterning illustrates the co-occurring elements in developing a shared understanding (episode 1, dotted), a shared sense of ownership of the direction of the organisation (episode 2, grid) and supportive social relations (episode 3, zig zag).

--- Figure 2 here---

Figure 2 shows how our concept-driven analysis has revealed configurations of motivational needs, problem structuring activities, and aesthetic experiences of participants in-situ, without, however, suggesting a precise match of characteristic problem structuring activities to motivational needs and aesthetic experiences. For example, the opportunity for adaptability and creativity was relevant both to the development of competence (episode 1), as well as for volition (episode 2), when creatively imagining future organisational activities. Moreover, the concept of an 'improvement activity' appeared in all three episodes: in episode 1 as the participants' competence in articulating their value proposition grew, but also in episode 2 when participants clarified the direction that they wish their organisation to take. Finally, episode 3 can be interpreted as an improvement activity as participants identify the need for training to professionalise their approach to fundraising. Similarly, the immersive aesthetic experience can be seen in all three episodes, related to the sensations in model interaction (episode 1), the ability to step outside of the real-world through imagination (episode 2) and in perceiving oneself as part of the system that is being modelled (episode 3).

5.1 Understanding how methods work

The interpretive episodes have illustrated how the proposed sensitising device helps to make visible eudaimonic and hedonic dimensions that appear to be inherent in the observed problem structuring processes. This enriches our understanding of how constitutive features of methods for problem structuring can be experienced as intrinsically motivating in practice. For example, our analysis illustrates how participant engagement unfolds as the experience of fellowship and relatedness in-situ. This understanding of how motivational aspects of participatory modelling work in practice complements principles-based accounts of why modelling should include multiple stakeholders (e.g. Ormerod and Ulrich, 2013). Thus, the primary contribution of this exploratory study is an extended conceptualisation of affordances (Chemero, 2003) in model-supported problem structuring interventions (Franco, 2013) by including motivational affordances, that are actualised by participants during interactions in-situ (Chen et al., 2019).

The term 'second generation' problem structuring methods (Durugbo, 2020) has been proposed to refer to methods that address domain-specific issues (e.g. Davis, MacDonald, & White, 2010). In particular, the Business Model Canvas (BMC), which was used in the workshop, is based on a domain-specific ontology which suggests a set of activity areas of relevance, or story components (e.g. customer relationships, value proposition) as well as possible exchange relationships between them (cf. Gregory, Atkins, Burdon, & Elliott, 2013; Osterwalder, 2004). During the workshop, participants thus engage with a problematic situation through an exploration of the canvas' narrative backstory. As such, the BMC appears suited for aiding with structuring a narrower range of problematic situations than the traditional set of problem structuring methods (Mingers & Rosenhead, 2004). Yet, within its domain, the BMC has shown great situational- and contextual flexibility, e.g. to develop complex sustainable, rather than mainstream, business models (Joyce & Paquin 2016), and to generate a variety of innovative models from the same ontology (Burger, 2020; França,

Broman, Robèrt, Basile & Trygg, 2017). Here, adopting an affordance-based lens to understand how methods for problem structuring work, highlights the importance of taking into consideration both the ease with which motivational affordances in-situ can be realised by participants, and, at the same time, how a method maintains its potential to aid participants in generating a varied set of models across a range of problematic situations.

5.2 Designing for participant engagement

As the interpretive episodes have illustrated, the situational characteristics (e.g. skills of participants and prior relatedness) and the artefactual affordances (e.g. model modifiability) interact with each other in complex and emergent ways in the process of enabling participants to satisfy their motivational needs. Given this interplay, a systemic design approach which aims to integrate situated motivation as a process, social constructivism and human-centred design (cf., e.g. Egenfeldt-Nielsen, 2007; Squire, 2006) appears relevant to explore opportunities for developing next-generation problem structuring methods through iterative design approaches (Zhang, 2008). Here, a motivational affordance perspective on methods for problem structuring may unite various method design considerations (such as cognitive efficacy (Eden, 1992b), usability (Franco, 2013), affective and emotional performance (Ackermann et al., 2016; Burger et al., 2018)) with a view to considering the different approaches' possible modularity and scalability (Taket & White, 2000). Such considerations do not need to be constrained to single methods but extend to multi-methodological designs. For example, following a qualitative problem structuring process with the canvas, it is possible to connect the BMC with further stages of quantitative modelling, such as system dynamics modelling and business analytics approaches (Cosenz & Bivona, 2020; Cosenz, Rodrigues, & Rosati, 2019; Hindle & Vidgen, 2017). Such method combinations may also be reflected upon with a view to understanding their motivational affordances and whether the skill, or competence level of the participants can be developed over time (Tako & Kotiadis, 2015).

5.3 Reflection on enriching research

Reflecting on the research approach which was adopted in this paper, the interplay between the sensitising device and empirical material constitutes a form of 'enriching research' (Stiles, 2015) which is aimed at improving practice by developing more differentiated ways of perceiving the world. OR practitioners make use of both codified (explicit) and non-codified (tacit) knowledge in their practice, and this expertise is continuously subject to revision. The sensitising device developed in this paper enriches the repertoire available for reflection on practice, allowing practitioners to explore the 'in-between' of what participants say and do in model-supported interactions and the unfolding of participant engagement. For example, it may direct attention to both scripted and non-scripted interaction opportunities (Hovmand, Andersen, Rouwette, Richardson, Rux, & Calhoun, 2012) that aided participants to co-create meaning in ways that appear to increase the individual's connectedness to the problem challenge (relatedness) and which appear to enhance the participants' joint ability to intervene in the problematic situation (competence and autonomy) and, thus, contribute to the continuous refinement of our understanding of how intrinsically motivating experiences of participants unfold in problem structuring interventions.

5.4 Limitations and areas for further research

The study presented in this paper has only begun to illuminate how SDT and interaction aesthetics can aid with understanding participant engagement in problem structuring interventions, without exhausting either of these perspectives conceptually or methodologically (e.g. Locher et al., 2010; Ryan & Deci, 2001).

Firstly, the presented case study is based on a non-codified self-facilitated method for problem structuring, i.e. not drawn from the traditional set of methods (cf. Rosenhead, 2013). As such, further research might seek to understand configurations of needs-realising problem structuring processes and associated aesthetic participant experiences with different problem structuring

methods, self-facilitated and with facilitators (Lami & Tavella, 2019) across multiple case studies. Such research may also consider temporal dynamics during an intervention (Tavella & Franco, 2015). Moreover, further research could consider a spectrum of motivational experiences, as well as sources, ranging from extrinsic to intrinsic motivations. Additionally, future research could strive for triangulation, e.g. by involving the use of questionnaires. This could take place in (quasi-)experimental set-ups, using nonparticipant observation. Alternative analysis approaches, such as a systematic coding scheme with multiple coders to achieve inter-coder reliability, could be used in pursuit of scientific replicability.

Second, future work should start with a systematic meta-analysis of prior publications using a range of keywords to reveal the depth of knowledge in the Soft OR community about the eudaimonic and aesthetic participant experiences which may have been discussed in prior OR work using a different terminology. Similarly, future research could start with a systematic review of multiple theories of motivation, particularly within positive psychology (cf. Hester and Adams 2017; Seligman and Csikszentmihalyi 2014) to broaden the set of lenses for studying participant engagement in-situ.

Third, the relevance of participant engagement for continued learning processes should be studied further. Indeed, this study does not develop a nuanced conceptualisation of how the intertwining of aesthetic and motivational experiences of participants, who engage in a problem structuring activity, leads to high-quality learning (Belton & Elder, 1994; Lane, 1995; Pasch, 2017). Moreover, this research has not entered into a dialogue with prior experimental work in OR which has studied participant learning (Monks, Robinson, & Kotiadis, 2014, 2016) and work which has sought to evaluate the performance of problem structuring methods using quantitative measures (Rouwette, Korzilius, Vennix, & Jacobs, 2011; Rouwette, Vennix, & Felling, 2009; Scott, Cavana, & Cameron, 2013, 2016).

Fourth, this study does not consider the possibility that clients of OR consultants may see interventions as a means for strategic human resource management, including the pursuit of covert aims, such as team building, in addition to overtly declared aims relating to a specific problem situation. As such, it does not account for the fact that problem structuring interventions are steeped in a socio-political understanding of the world which gives rise to questions about how interventions may be used strategically to influence the behaviour of participants and how adjustments to power relationships in-situ evolve. Taking an extended view, i.e., including pre-intervention engagement of the OR consultant with the client system (Franco & Montibeller, 2010; Ormerod, 1997b), could provide further insight.

Finally, reflecting on the experience-based insights about 'doing what feels good' (White & Taket, 1993) and 'toys that a group can play with together' (Eden, 1992a), this exploratory work has not considered that these statements were made by experienced facilitators. However, facilitation skills are highly valued in Soft OR (Ackermann, 1996; McFadzean, 2002a, 2002b; Nelson & McFadzean, 1998), and it is possible that these insights are indicative of the facilitators' sensibility and responsiveness to the participants' motivational needs in-situ, e.g., by building rapport or by facilitating hedonic experiences, e.g., by adapting the level of challenge or difficulty of a modelling process to the participants' needs (Ackermann, 2011; Ormerod, 2014). Hence, future research could seek to provide insight into adaptive facilitation styles (Yearworth & White, 2016) as facilitators help participants navigate through the "ebb and flow" (Franco & Greiffenhagen, 2018) during an intervention (Eden, 1990).

6. Conclusion

This study explores how intrinsically motivating participant engagement unfolds in a problem structuring intervention. Grounded in concepts from self-determination theory, interaction aesthetics and the generic constitutive definition of problem structuring methods, a sensitising device is constructed to explore the experiential character of participant engagement in-situ.

Applied to empirical episodes from a case study, the sensitising device illustrates how eudaimonic and hedonic participant experiences unfold during characteristic problem structuring activities as participants realise motivational affordances. By offering a nuanced view on how intrinsically motivating participant experiences unfold in-situ, this study enhances the existing conceptual repertoire for studying participant engagement in-situ during Soft OR interventions, and thus enriches our understanding of how methods work.

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Declaration of interest statement

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